

11. DOMIN, K. Vergleichende Studien über den Fichtenspargel. Sitzungsber. kgl. böhm. Gess. Wiss., II Kl., I Stück: 1-111. 1915.
12. DOYEL, B. E., and L. M. Goss. Some details of the structure of *Sarcodes*. *Madroño* 6: 1-7. 1941.
13. DRUDE, O. *Pirolaceae*. in A. Engler and K. Prantl. *Die natürlichen Pflanzenfamilien* 4<sup>1</sup>: 3-11. 1889.
14. EASTWOOD, ALICE. Some new species of Californian plants. *Bull. Torrey Bot. Club* 29: 75-82. 1902.
15. FOSTER, A. S. Problems of structure, growth and evolution in the shoot apex of seed plants. *Bot. Rev.* 5: 454-470. 1939.
16. HILL, JOHN. *The British herbal*. . . . London. 1756.
17. IRMISCH, T. Einige Bemerkungen über die einheimischen *Pyrola*-Arten. *Bot. Zeit.* 14: 585-591, 601-602. 1856.
18. JEPSON, W. L. *Manual of the flowering plants of California*. Berkeley. 1925.
19. ————. *A flora of California*, vol. 3, part 1. Berkeley. 1939.
20. KAMIENSKI, F. Die Vegetationsorgane der *Monotropa hypopitys* L. *Bot. Zeit.* 39: 457-461. 1881.
21. ————. Les organes végétatifs du *Monotropa Hypopitys* L. *Mém. Soc. Nat. Sci. Nat. Cherbourg* 24: 5-40. 1882.
22. KOCH, L. Das Entwicklung des Samens bei *Monotropa Hypopitys* L. *Jahrb. wiss. Bot.* 13: 202-252. 1882.
23. LINNAEUS, C. *Species Plantarum*. 1753.
24. MAC DOUGAL, D. T. Symbiotic saprophytism. *Annals Bot.* 13: 1-47. 1899.
25. NUTTALL, T. *The genera of North American plants*. . . . Philadelphia. 1818.
26. RENDLE, A. B., and others, editors. *International rules of botanical nomenclature*. . . dritte Ausgabe. Jena. 1935.
27. SMALL, J. K., and A. M. VAIL. Report of the botanical exploration of southwestern Virginia during the season of 1892. *Mem. Torrey Bot. Club* 4: 93-201. 1893-1894.
28. SMALL, J. K. [*Monotropaceae*] in *North American Flora* 29<sup>1</sup>: 11-18. 1914.
29. TORREY, J. On *Ammobroma*, a new genus of plants. . . . *Ann. Lyc. Nat. Hist. New York* 8: 51-56. 1864.
30. WYDLER, H. Kleinere Beiträge zur Kenntnis einheimischer Gewächse. *Flora N. R.* 18: 613-617. 1860.

## PODOCARPUS GRACILIOR IN CULTIVATION

JOHN T. BUCHHOLZ

The "African fern-pine," in recent years popular as a decorative tub plant and also planted in the open as an ornamental conifer, may become a tree of considerable size. Since mature specimens growing in California have produced pollen cones during the past winter, it is now possible to identify the species as *Podocarpus gracilior* Pilger.

The plant has been regarded as a conifer of South African origin and has usually passed under the nursery trade name of "*Podocarpus elongata*," which is unquestionably an error. The latter is the legitimate name of a plant of South Africa where there are two narrow leaved species that have been confused and have at one time or another passed under this botanical name. The California exotic has narrow leaves that are somewhat similar to those of *Podocarpus elongatus* L'Herit. (the earliest described

species in this genus), but the pollen cones and seeds differ considerably. It resembles *P. falcatus* (Thunb.) R. Br. (*P. elongata* Carr.) more closely than *P. elongatus* L'Herit., but has green instead of brown twigs, leaves that become longer and wider, and pollen cones that are more than twice as long; also the tips of individual microsporophylls (connectives) of the pollen cones are more pointed. In both *P. gracilior* and *P. falcatus* the pollen cones are axillary, borne singly or in fascicles of two or three.

The seeds of *Podocarpus gracilior* were brought over from East Africa in 1911 by Mrs. Stewart Edward White. Franceschi, of Santa Barbara, germinated some, if not all, of these. The statement is usually current that these seeds were introduced from South Africa (an error which has appeared in print), but the material itself does not agree with the descriptions of either of the narrow-leaved South African podocarps. It fits very closely the description of *Podocarpus gracilior*. This entire question has been clarified recently by a letter received from Colonel Stewart Edward White in which he states that the tree from which these seeds were collected was located in Kenya, British East Africa. This region of Africa is included in the range given for *Podocarpus gracilior* Pilger. Specimens of this species at the United States National Herbarium were collected in Kenya by Edgar A. Mearns of the Smithsonian African Expedition which was led by Theodore Roosevelt in 1909-1910. The male flowering material collected in California in January and February, 1941, in three widely separated localities agrees in all essential details with the Mearns specimens.

*Podocarpus gracilior* is dioecious, as are nearly all species of *Podocarpus*. Except for the limited number of original seedlings, the trees in California have been propagated from cuttings. The stock tree used for propagation since about 1922 at the Coolidge Rare Plant Garden Nursery in Pasadena is a male tree. During the past winter Mr. J. J. Mulvihill has kindly sent me a number of reproductive twigs. Thousands of plants have been grown as cuttings from this tree over a period of years and furnished to the nursery trade under the names "African Fern-Pine" and "*Podocarpus elongata*." They do very well as tub plants and when these long-suffering decoratives become too old they may be transplanted to parks and gardens. The writer has seen this conifer used as a street tree in Los Angeles and Pasadena. Apparently they do not become reproductive until they are mature specimens of large size. The largest known specimen, about fifty feet high, is growing at Alameda Plaza in Santa Barbara where two other mature specimens may be seen, none of which had been observed in reproductive condition. However, during July, 1941, Mr. Van Rensselaer of Santa Barbara Botanic Garden found one of these (located in the east section of Alameda Plaza) bearing seeds. Many of the seeds were abortive when less than half grown; some



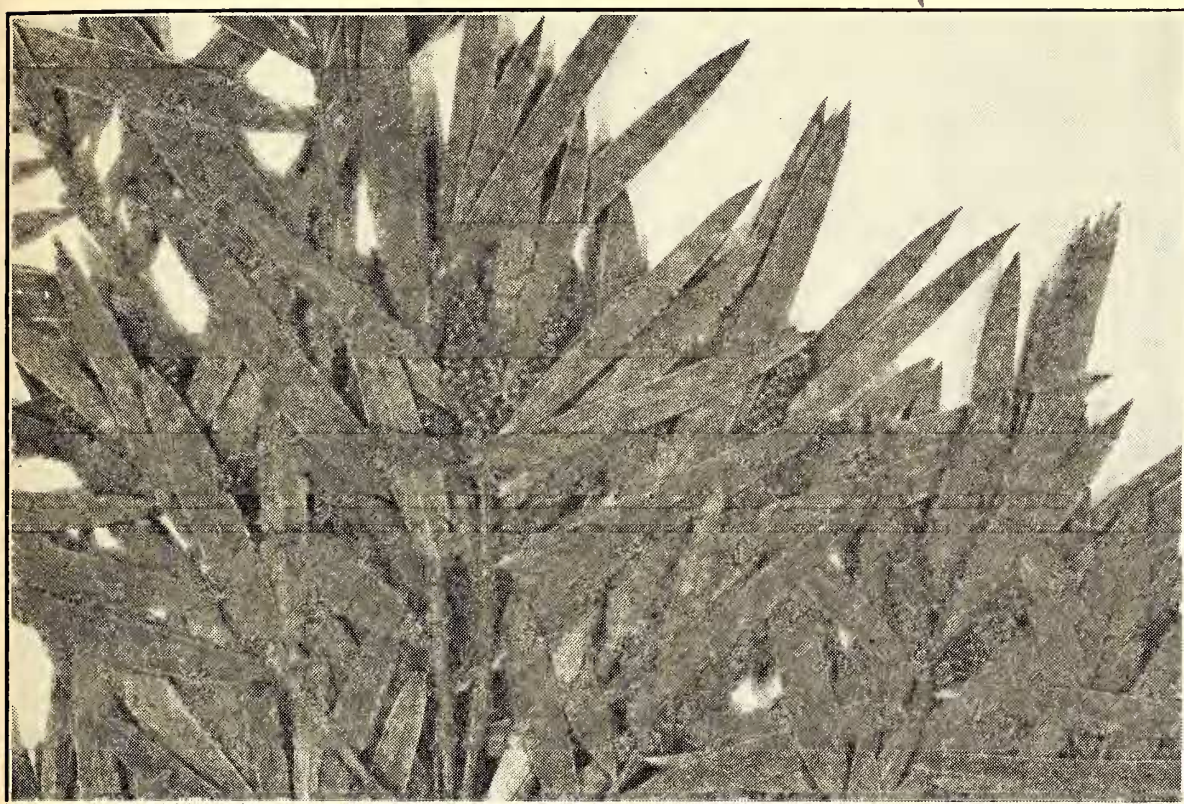


FIG. 1. Twigs of *Podocarpus gracilior* Pilger bearing nearly full grown pollen cones, January, 1941.

had enlarged to full size, but all of those which were examined by the writer, were without embryos, with the endosperms shriveled in the manner usual for unpollinated parthenocarpic seeds.

With this one exception, all reproductive specimens of *P. gracilior* thus far observed have proved to be male, although presumably the seeds would produce equal numbers of male and female seedlings. The location of many of the original seedlings is not known. Two specimens growing on the estate of Colonel Stewart Edward White near Burlingame have not been observed in reproductive condition at any time. The three large trees at Alameda Plaza are probably seedlings, and likewise any other old specimens growing in Santa Barbara. It is likely that the tree belonging to Mrs. E. N. Hazard, mentioned by Van Rensselaer (*Trees of Santa Barbara* 1940, p. 84) is also one of the original seedlings. In 1936 the writer found five or six large specimens on the Dwight Murphy estate at Montecito, Santa Barbara County and these may be seedlings. They have not been observed in reproductive condition.

The late Miss Kate Sessions of San Diego informed the writer in 1936 that she had obtained three of the original seedlings from Franceschi. The location of two of them was given. One is growing in the gardens of Julius Wangenheim, 148 West Juniper Street, San Diego. Another is the large tree at the Rosecroft Gardens in San Diego. The latter plant was not reproductive in



1936, but was found with pollen cones during the past winter. Mr. A. D. Robertson furnished the writer with male reproductive specimens from this plant in January and February, 1941.

A male tree growing in the Botanical Garden of the University of California, Berkeley, was observed to be in reproductive condition in January, 1941, by Mr. Donald G. Nelson of that institution. The origin of this plant is not known to the writer. Aside from the dozen plants enumerated here, there are probably a number of other specimens in cultivation on private estates that represent original seedlings, which were distributed in the days before it was discovered that these plants are easily propagated.

University of Illinois, Urbana,  
July 21, 1941.

## THE TAXONOMIC STATUS OF MICROSTERIS GREENE

HERBERT L. MASON

Perhaps no member of the Polemoniaceae has been so greatly misunderstood as the very polymorphic aggregate species, *Phlox gracilis* (Dougl.) Greene. It has been variously treated as a member of the following genera: *Gilia*, *Collomia*, *Phlox*, *Navarretia*, *Polemonium*, and is the type species of the genus, *Microsteris* Greene; it has been divided and subdivided into species, subspecies, varieties, subvarieties and forms within these genera according to the particular whim of the author treating it. The plant ranges from the Pacific Coast to the Rocky Mountains and from temperate Alaska south to Mexico, and recurs in the Southern Hemisphere in Bolivia, Chile, and Argentina. Essentially an early spring annual, it occurs from the coastal bluffs to timberline. The intent of the present paper is to deal only with the generic position of the aggregate species and not to be concerned with the status and disposition of the smaller taxonomic units. Therefore, the entire group of variants will be treated, for the present at least, as one large, polymorphic species.

The species was first collected by Douglas on the banks of the Spokane River [Washington] and given the manuscript name, *Collomia gracilis*; it was first described by Hooker (6) in 1829 under the name *Gilia gracilis* with *Collomia gracilis* Douglas cited as a synonym. In 1887 Greene (4) referred the species to the genus *Phlox* with the statement: "This interesting plant came to the knowledge of botanists some years in advance of *Phlox Drummondii* Hook. and its allies. It was at first a thing of dubious aspect, not at home either in *Gilia* or *Collomia*. But since the discovery of the Texan group of annual species of *Phlox* with peculiar habit, it must have been the mere force of custom which has kept men from seeing that it is an absolutely perfect congener of *Phlox Drummondii*." In 1891 (7, p. 433) O. Kuntze, recognizing the page priority of *Navarretia* over *Gilia*, made a purely nomencla-